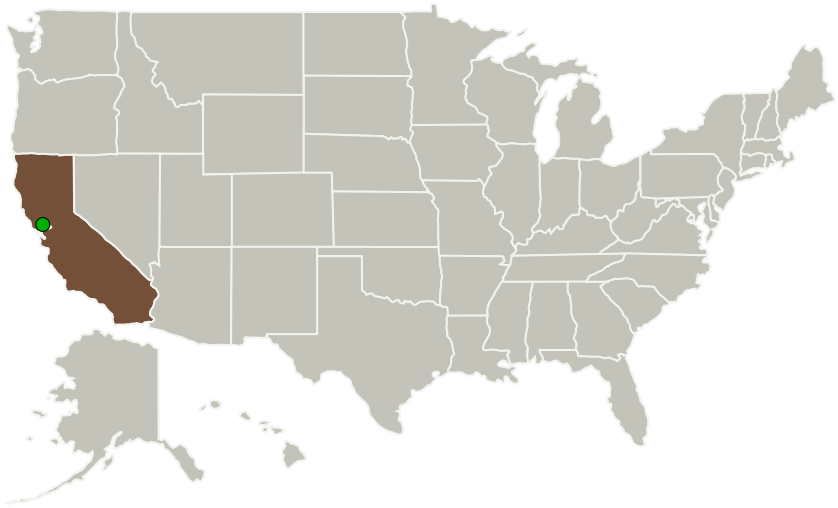
Multi Wavelength Greenhouse gas LIDAR (MUGGLE), Phase I

Completed Technology Project (2015 - 2015)

Project Introduction

Climate change is a growing concern, leading NASA to the need to track concentrations of such greenhouse gases as CO2 and CH4, including the need to detect them daytime, nighttime, and all year. To achieve this, NASA has proposed such projects as Global Precipitation Measurement (GPM), Geostationary Coastal and Air Pollution Events (GEO-CAPE), and Active Sensing of CO2 Emissions over Nights, Days, and Seasons (ASCENDS). In support of these programs, and in particular ASCENDS, Luminit, LLC, proposes to develop the innovative Multiwavelength Greenhouse Gas Lidar (MUGGLE). The MUGGLE is a high-resolution spectroscopic measurement system that can detect and measure CO, CO2, CH4, and H2O (vapor) with great accuracy and speed. The MUGGLE will be fully automated, using only eye-safe laser wavelengths and powers, with tunability and real-time calibration. Through the use of cavity dumping, the MUGGLE will achieve laser linewidth <50 MHz for the best resolution, and significantly improves on existing greenhouse gas measurement technology. During Phase I we will begin this research by studying the methods of measurement, designing a system, and fabricating a laboratory breadboard prototype, ending at TRL-4. In Phase II we plan to further develop the MUGGLE, resulting in a TRL-6 engineering prototype that can be commercialized into both the specified device for NASA and an accurate system for measuring methane leakage.

Primary U.S. Work Locations and Key Partners



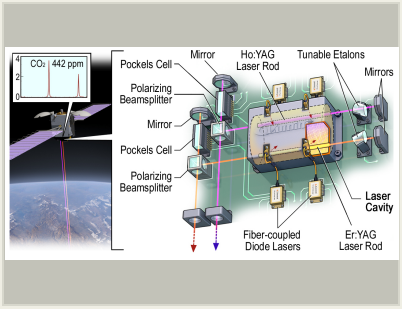


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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations
California

Project Transitions

June 2015: Project Start

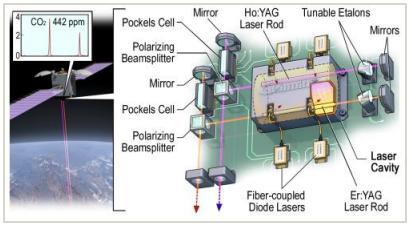
December 2015: Closed out

Closeout Summary: Multi Wavelength Greenhouse gas LIDAR (MUGGLE), Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/139252)*

Images



Briefing Chart Image
Multi Wavelength Greenhouse gas LIDAR (MUGGLE), Phase I *(https://techport.nasa.gov/image/126693)*

Project Management

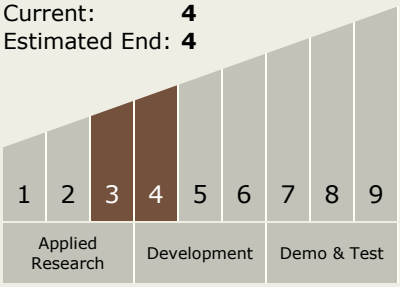
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Russell Kurtz

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System